The Contribution of the Ecu to Exchange-Rate Stability: A Further Comment

1. Introduction

The contribution of the Ecu to exchange-rate stability has recently been the focus of various articles by Jager and de Jong (1988a, 1988b) on the one hand and by Sarcinelli (1986, 1988) on the other. The thesis of the former is that, though the Ecu has exerted a stabilizing influence on nine of the twelve comparisons carried out between currencies, the three situations of increased instability — the relationships dollar/mark, dollar/yen and mark/yen — have been strong enough not only to balance the Ecu's stabilizing influence but to go farther to make the Ecu's global effect one of increased currency instability. Such a result has been reached in a mean-variance framework by means of the Capital Asset Pricing Model (CAPM). Sarcinelli, on the other hand, has affirmed a substantially positive contribution of the Ecu to exchange-rate stability and has criticized the Jager-de Jong's results.

What I intend to show in the present work is that the effect of the Ecu on exchange-rate stability mainly depends on the presence of arbitrage activity; that is the global effect is considerably affected by their introduction. My conclusions rest on results derived from the use of the CAPM over the periods 1985.01-1987.01 and 1987.02-1989.02; the analysis is based on the one-month interest rates on eurocurrencies and the cross rates of exchange.[1] CAPM analysis is carried out on the private Ecu even though this is not a fully correct procedure. As stressed by Sarcinelli, in fact, "the Ecu should be considered in all its functions of an international reserve currency and not as an investment currency". To a certain extent such a function has been introduced in my analysis (and in Jager-de Jong's analysis) by means of arbitrage: *i.e.* the flows of national currencies which the Ecu market gives rise to in order to counterbalance an excess demand for Ecus on the euromarket.

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[1] For a wide description of CAPM and portfolio selection see SHARPE, *Investments*, 1985.

TABLE 1

COMPOSITION OF OPTIMAL PORTFOLIOS*

Percentage values: in brackets the share to add to (or subtract from) the value out of brackets when the Ecu is not allowed to have part in the portfolio.

1985-87

	DM	ff	lit	dg	stg	us	sfr	yen	dk	bfr	ecu
DM	–(0)	2(0)	9(0)	63(0)	–(0)	–(0)	10(0)	–(0)	9(0)	11(0)	–
ff	17(6)	–(0)	–(0)	–(58)	–(0)	3(2)	–(0)	–(0)	–(6)	–(0)	80
lit	69(0)	9(0)	–(0)	–(0)	–(0)	9(0)	–(0)	–(0)	–(0)	–(0)	–
dg	83(0)	–(0)	–(0)	–(0)	1(0)	–(0)	–(0)	–(0)	–(0)	–(2)	2
stg	–(0)	–(0)	–(0)	–(0)	–(0)	21(–5)	–(0)	–(0)	37(23)	–(8)	36
us	–(0)	–(0)	–(0)	–(0)	–(0)	–(0)	–(0)	–(0)	100(0)	–(0)	–
sfr	18(0)	–(0)	–(0)	62(0)	–(0)	–(0)	2(0)	–(0)	–(0)	–(0)	–
yen	–(0)	–(0)	–(0)	–(0)	–(0)	–(0)	–(0)	18(0)	80(0)	–(0)	–
dk	25(11)	–(0)	–(0)	33(0)	3(2)	–(0)	–(0)	–(0)	4(1)	15(2)	18
bfr	55(7)	–(0)	–(0)	–(0)	–(0)	1(0)	–(0)	–(0)	–(0)	–(0)	7

1987-89

	DM	ff	lit	dg	stg	us	sfr	yen	dk	bfr	ecu
DM	–(0)	–(0)	6(0)	73(0)	–(0)	3(0)	10(0)	–(0)	–(0)	8(0)	–
ff	–(0)	–(0)	15(2)	13(2)	–(0)	–(2)	12(1)	–(0)	25(–4)	19(4)	7
lit	35(0)	11(0)	–(0)	4(0)	6(0)	2(0)	10(0)	1(0)	22(0)	6(0)	–
dg	67(16)	–(7)	–(0)	–(0)	–(5)	–(0)	–(0)	–(0)	–(0)	–(0)	28
stg	–(0)	–(0)	–(0)	–(34)	–(0)	–(0)	–(0)	18(8)	–(0)	–(36)	81
us	–(0)	–(0)	–(0)	–(0)	–(0)	–(0)	–(0)	–(0)	100(0)	–(0)	–
sfr	–(0)	–(0)	15(0)	45(0)	8(0)	–(0)	–(0)	13(0)	5(0)	11(0)	–
yen	–(0)	–(0)	–(0)	–(0)	26(0)	–(0)	43(0)	–(0)	31(0)	–(0)	–
dk	–(0)	11(0)	11(0)	49(0)	8(0)	–(0)	8(0)	–(0)	12(0)	–(0)	–
bfr	19(0)	24(0)	9(0)	29(0)	1(0)	–(0)	–(0)	–(0)	–(0)	–(0)	–

* The sign "–" means that the currency is not included in the portfolio.
DM = Deutsche Mark; ff = French franc; lit = Italian lira; dg = Dutch guilder; stg = English pound; US = US dollar; sfr = Swiss franc; sdr = Special drawing right; dk = Danish krone; bfr = Belgian franc.

2. The analysis

As mentioned above, the main tool of my analysis is the mean-variance method. More specifically I have made use of the Kuhn-Tucker quadratic algorithm in order to select portfolios with short-sells not allowed, thus reflecting the position of a lender. Portfolios are chosen on the efficient frontier as the minimum-risk ones.

Since the return on an asset mainly depends on the country taken as a benchmark, the exercises of investment simulation have been repeated for each of the currencies taken into consideration. The simulation exercises subsequently were repeated, this time excluding the Ecu from the range of choices in order to stress its contribution (whether positive or negative) to exchange-rate stability.

Table 1 shows the composition of portfolios for investors in each of the countries and in each of the two periods examined. Figures in brackets are the percentage weights of the currencies in the portfolios to be added to (or subtracted from) the respective figures out of the brackets when the Ecu is excluded. Obviously, in the latter case the column concerning the Ecu should not be considered. As it would be rather difficult to draw conclusions from such an elaborate table, others showing average portfolios are presented. Averages have been weighted by countries' GNPs (in $1980) and investors assembled in three groups: the Group of Five (West Germany, France, U.K., USA and Japan), Other Countries (Belgium, Italy, Denmark, Netherlands, Switzerland) and the Total Population. Compositions of such average portfolios are shown in Tables 2 (including the Ecu) and 3 (excluding the Ecu).

AVERAGE PORTFOLIOS FOR GROUPS OF INVESTORS* TABLE 2

	Group of Five**		Other Countries		Total Population	
period	85-87	87-89	85-87	87-89	85-87	87-89
DM	2.3	–	61.9	32.0	11.8	5.2
ff	0.2	–	5.5	10.0	1.1	1.6
lit	1.0	2.8	–	1.7	1.0	2.8
dg	7.6	10.6	7.6	12.7	7.7	11.0
stg	–	4.3	0.3	5.0	–	4.4
us	2.5	0.4	5.6	1.2	3.0	0.5
sfr	4.6	10.0	–	6.7	3.9	9.4
yen	–	1.8	9.5	1.7	1.5	1.8
sdr	64.7	56.3	0.3	15.0	54.2	49.6
dk	1.1	0.9	5.6	2.7	2.0	1.2
bfr	1.3	3.5	1.0	4.6	1.0	3.7
ecu	14.4	9.0	2.2	3.6	12.4	8.1

* Averages are weighted with respective countries' GNPs (in $ 1980).
** Group of Five is formed by Germany, France, U.K., USA and Japan.

TABLE 3

AVERAGE PORTFOLIOS FOR GROUPS OF INVESTORS EXCLUDING THE ECU*

	Group of Five**		Other Countries		Total Population	
period	85-87	87-89	85-87	87-89	85-87	87-89
DM	3.1	–	63.4	34.0	12.7	5.5
ff	0.2	–	5.5	10.9	1.1	1.7
lit	1.0	3.1	–	1.7	1.0	3.0
dg	15.5	14.2	8.0	12.7	15.7	14.0
stg	–	4.3	0.4	5.6	–	4.9
us	2.3	0.7	5.6	1.2	2.8	0.6
sfr	5.5	10.1	–	6.7	4.6	9.5
yen	–	2.6	9.5	1.7	1.5	2.5
sdr	68.1	55.8	0.4	15.0	57.0	49.1
dk	1.9	1.2	5.6	2.7	2.7	1.4
bfr	2.0	7.5	1.4	5.6	1.7	7.4

* Averages are weighted with respective countries' GNPs (in $ 1980).
** Group of Five is formed by Germany, France, U.K., USA and Japan.

3. The contribution of the Ecu to exchange-rate stability

Jager and de Jong, in their article, have computed the "divergences" of the optimal shares of US$ as to other currencies, to verify the contribution of the Ecu to exchange-rate stability. For each pair of currencies taken into consideration, such divergences have been obtained by summing up the variations of the optimal shares of the two currencies, including and excluding the Ecu, in the passage from one period to another.

Table 4 shows the variations in the passage from 1981-84 to 1985-87 and from 1985-87 to 1987-89. Data concerning the first of these comparisons, have been obtained by linking my data together with Jager-de Jong's data. The variations with or without the Ecu are almost similar and, for the "total population", the presence of the European currency, though almost without influence, cut down portfolio shares' variations by 2%. The presence of the Ecu was also positive for the countries of the "Group of Five", excluding the dollar/pound relationship (+ 11%).

As far as the "Other Countries" are concerned, the presence of the Ecu seemed to result in a greater instability, with variations of portfolio shares, increasing, on average, by 5%.

What seems strange to me, in Jager-de Jong's work is that the search for the Ecu's contribution to stability has been limited to the relationships between the mark and the non-European currencies; it is worth noting, in fact, that the Ecu does not appear either in portfolios of non-European investors (see Table 1) or in those of German investors.

On the basis of this consideration I have elaborated Table 5, that shows

TABLE 4

DIVERGENCES IN THE SHARES OF US DOLLAR AS TO OTHER CURRENCIES IN MINIMUM RISK PORTFOLIOS
Periods from 1981-84 to 1985-87
and from 1985-87 to 1987-89

	Total Population			Group of Five			Other Countries		
	$-DM	$-stg	$-yen	$-DM	$-stg	$-yen	$-DM	$-stg	$-yen
from the third to the fourth period									
Excluding the Ecu	85.7	78.2	65.7	86.8	85.7	75.7	75.8	34.0	33.9
Including the Ecu	84.8	76.0	66.5	82.8	82.5	75.5	74.9	34.1	36.9
Including the Ecu with arbitrages	87.2	76.9	66.5	85.8	83.6	75.5	75.6	34.4	36.9
from the fourth to the fifth period									
Excluding the Ecu	5.0	7.1	3.2	1.5	5.9	4.2	25.0	0.8	3.4
Including the Ecu	4.1	6.9	2.8	0.2	6.4	3.9	25.5	0.3	3.4
Including the Ecu with arbitrages	5.6	7.4	2.8	1.9	7.0	3.9	25.9	0.5	3.4

TABLE 5

DIVERGENCES IN THE SHARES OF SAMPLE CURRENCIES IN MINIMUM RISK PORTFOLIOS
from 1985-87 to 1987-89.

1985-87 to 1987-89	DM-stg	DM-sdr	stg-sdr	dg-stg	bfr-DM	bfr-dg
Total population						
excluding the Ecu	12.1	0.7	12.8	6.6	12.9	7.4
including the Ecu	11.0	2.0	8.0	1.1	9.3	0.6
including the Ecu with arbitrages	12.9	3.4	8.5	2.1	10.7	1.5
1981-84 to 1985-87 : only for DM-stg relationship and for Total Population						
excluding the Ecu	7.7					
including the Ecu	6.6					

the divergences in optimal portfolios shares, in the passage from the second to the third period, for some European currency and for the SDR.[2]

As far as the passage from the first to the second period is concerned it has been possible only to calculate the datum concerning the mark/pound relationship, other data being unavailable.

On the strength of the figures of Table 5, the Ecu seemed to make a considerable contribution to stability of exchange-rate rates among the analysed currencies (60% of the "excluding the Ecu" value between pound and SDR, 39% between mark and bfr, 300% between DG and pound and

[2] SDR is taken in analysis as it is formed by mark, franc and pound, so being affected by their variations.

more than 1000% between DG and Bfr) just in those countries where it has been created to bring stability (excluding the relationship between mark and SDR, +300%).

Jager-de Jong's conclusion regarding the Ecu's negative contribution to stability derives, in my opinion, from a too strict extension of their results, obtained in periods when the private Ecu and its market were not yet developed. In the periods I have examined, the Ecu seems neither to bring a positive contribution to the relationships among mark, dollar, yen and pound, nor to much disturb their markets; these investors (see Table 1) do not consider the Ecu as a currency worth holding. The positive contribution of the Ecu should therefore be searched for in the relationships among European currencies, where it is able to cut fluctuations down due to its appealing mixture of medium-high returns and great stability.

In the work by the two writers it has been affirmed that owing to money market liberalization, the Ecu's perspectives would not be very rosy. This thesis has not been confirmed; the Ecu, on the contrary (see Table 1) has been a good investment opportunity for investors resident in EEC countries. Unlike Jager-de Jong the evidence stressed by Giavazzi-Giovannini and Frankel (of a relationship strong dollar-weak mark and *vice versa*) is verified in the periods I have examined. In the passage from 1985-87 (weak dollar) to 1987-89 (dollar not very strong but certainly in recovery) the mark's shares owned by EEC investors were reduced very quickly, being replaced by other EMS currencies. In fact, when the dollar is strong and if the mark is weak, EMS investors are likely to hold dollars and, more easily, EMS currencies that, owing to the weakness of the mark, strengthen their positions in the System. That is what happened in the passage from 1985-87 to 1987-89.

4. The effect of arbitrage

Until now, unlike Jager-de Jong, I have not considered the presence of arbitrage caused by an excess of demand for the Ecu that gives rise to a compensatory (and involuntary) flow of EMS currencies, according to their weights in the Ecu basket. This process needs no voluntary flows from individual countries as it is caused by the switch of pressure from the euromarket to domestic markets.

Arbitrages have been included in the analysis by adding to the "including the Ecu" value the change of the Ecu's share in the period taken into consideration multiplied by the weight (or the sum of the weights) of the analysed currencies. The results of these operations are shown in Tables 4 and 5 as "including the Ecu with arbitrages" (as regards the effect of arbitrage on the relationships between European currencies — Table 5 —

calculations are made only for "total population"). If arbitrage is included, the presence of the Ecu causes a sharp rise of the instability of the mark/dollar and dollar/pound relationships in both periods. The effect of the Ecu on intra-EMS stability, on the contrary, is still positive, though rather reduced (excluding the mark/pound relationship, that gets worse by 6%).

5. Conclusion

The outcome of the present analysis is the effect of arbitrage on the stabilizing or destabilizing effect of the Ecu on exchange rates. When arbitrage is introduced into the analysis, the relationship between dollar and mark and pound gets worse (so creating instability) whereas the contribution of the Ecu to European currencies' stability remains positive, though reduced.

If, on the whole, there are no doubts about the positive effect of the Ecu on European currencies' stability, the sign of the effect on the relationships between the dollar and other currencies is entirely determined by the size of arbitrage operations. If the way they operate is the one supposed in my analysis (and in Jager-de Jong's analysis) the Ecu would have a negative impact on such relationships. It is at least reasonable, however, to doubt that arbitrages actually work as supposed in the above mentioned analysis, as a direct and immediate pressure on the currencies that form the Ecu, proportional to their weights in the basket. The effect of arbitrage could be more or less delayed in time as to the initial pressure on the euromarket, owing to the inefficient working[3] of the markets or giving rise to speculative forces in view of exchange-rate realignments within the EMS; they could also have a much greater or smaller final effect, owing to a series of "chain reactions" that could arise within the System. Their global effect is, however, unknown and not precisely measurable.

In sum, the difficulty of estimating the effects of arbitrage operations makes any objective evaluation of the Ecu's contribution to dollar exchange-rate stability virtually impossible.

The presence of the Ecu seems, on the contrary, to strengthen the relationships between European currencies, regardless of whether an estimate of arbitrage is included or not.

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[3] In the last years there have been wide margins for speculative operations. Divergences on interest and exchange-rate on official and synthetic Ecu reached, in several months, a value close to 0.5%. Such a value is strong enough to cover transaction costs and to allow a positive margin of return (Fornari, 1989) thus showing the incomplete working of the System.

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